Robust and Load Balanced Computing in Heterogeneous Environment

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PVM and Heterogeneous Environment

- Dynamic Environment
  - Heterogeneous computers
  - Computer turns off
  - Network failure
  - Unbalanced Workload
  - Multi users
- Features of the existing Softwares (PVM and MPI)
  - Node failures can be detected but can not be fixed
  - Advanced approach for load balancing is left for the user

Problem Statement

- This research aims at developing a sub-system to assist PVM for achieving

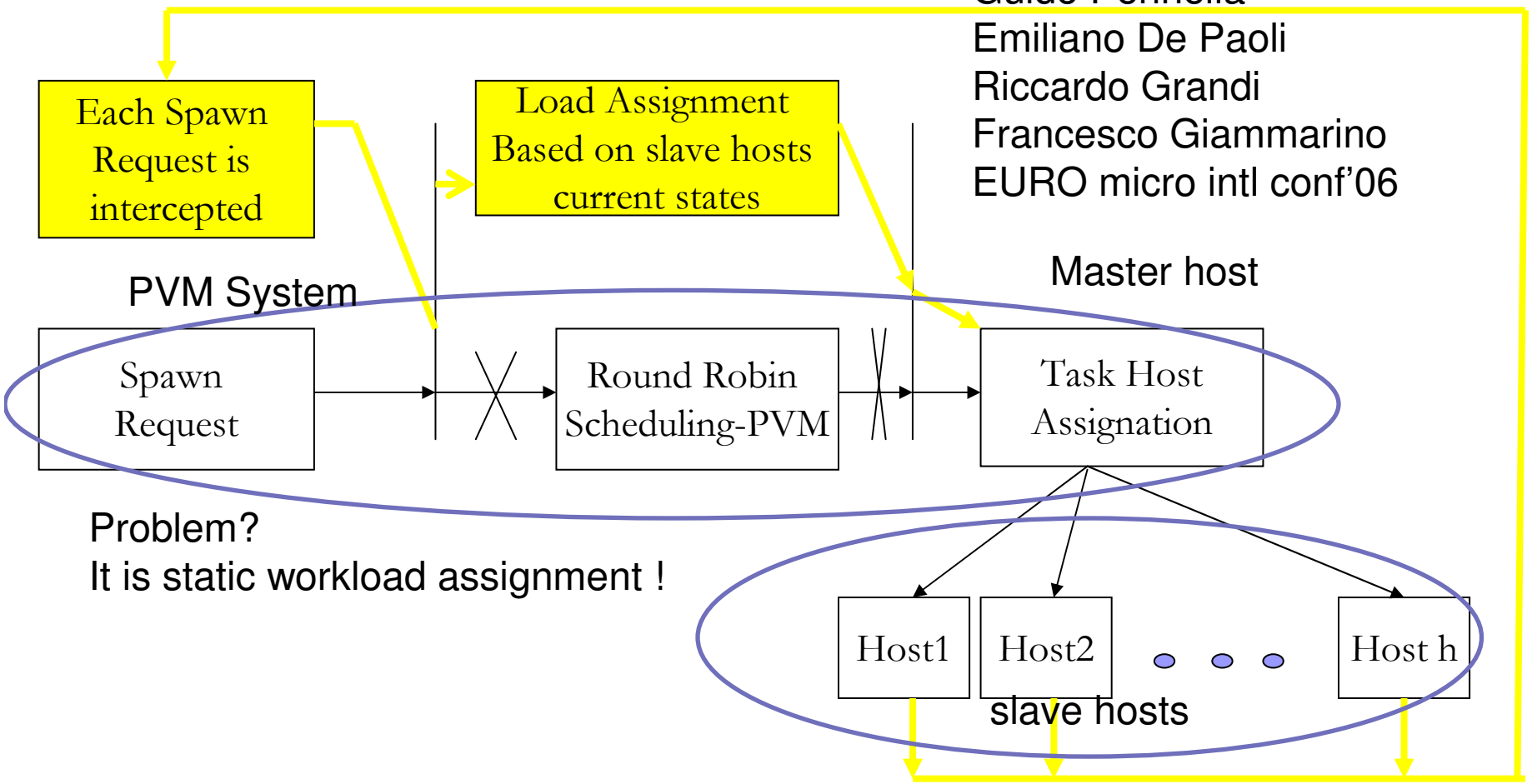
  (1) load balanced computing

  (2) robust computing

in heterogeneous environment

Recent Related Work

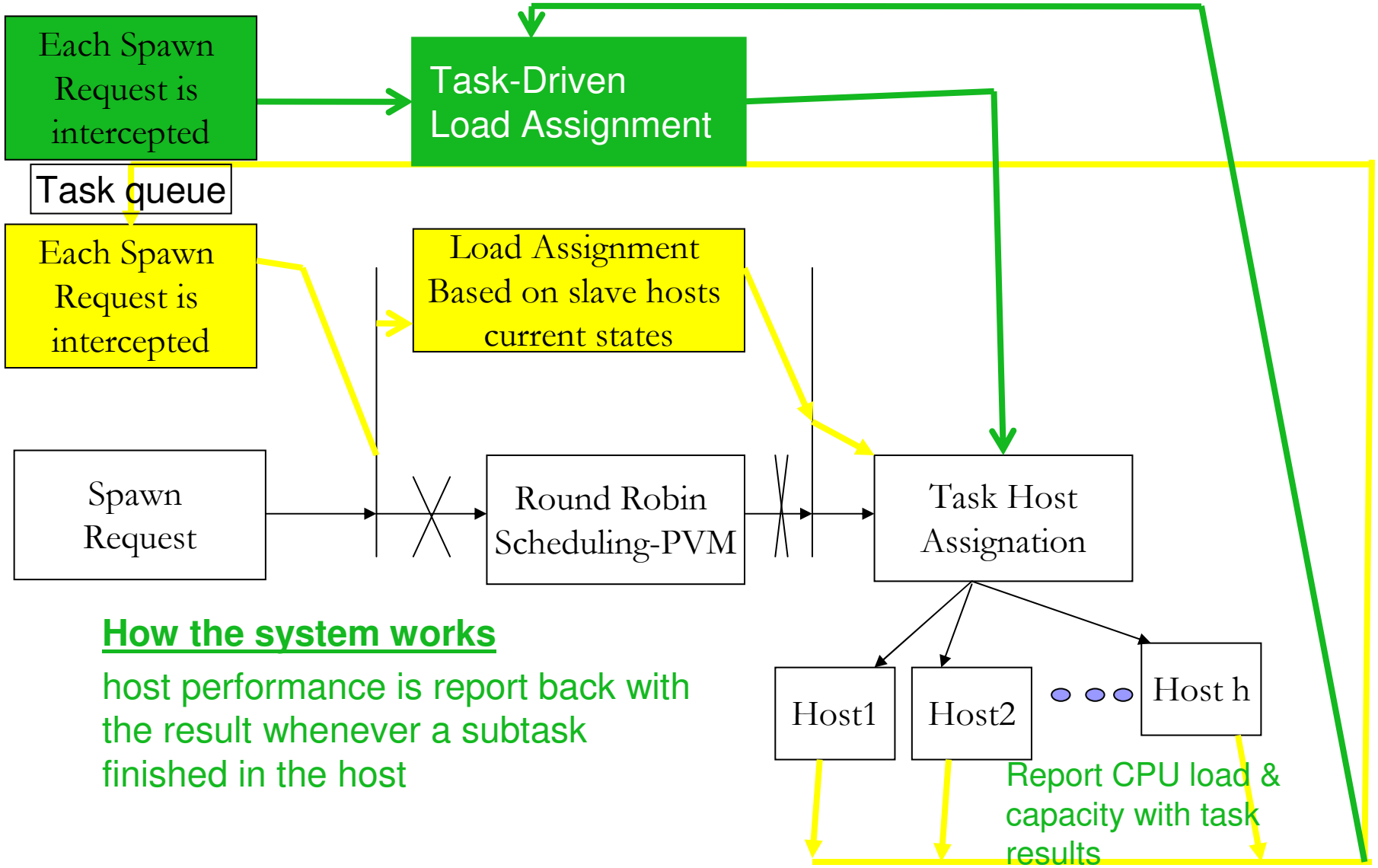
Christian Di Biagio
Guido Pennella
Emiliano De Paoli
Riccardo Grandi
Francesco Giammarino
EURO micro intl conf'06



- Assign workload dynamically
- Problems?
  - Too short period leads to communication overhead
  - Too long period, tasks can not be optimally assigned

Proposed System Architecture

1. Workload Balancing

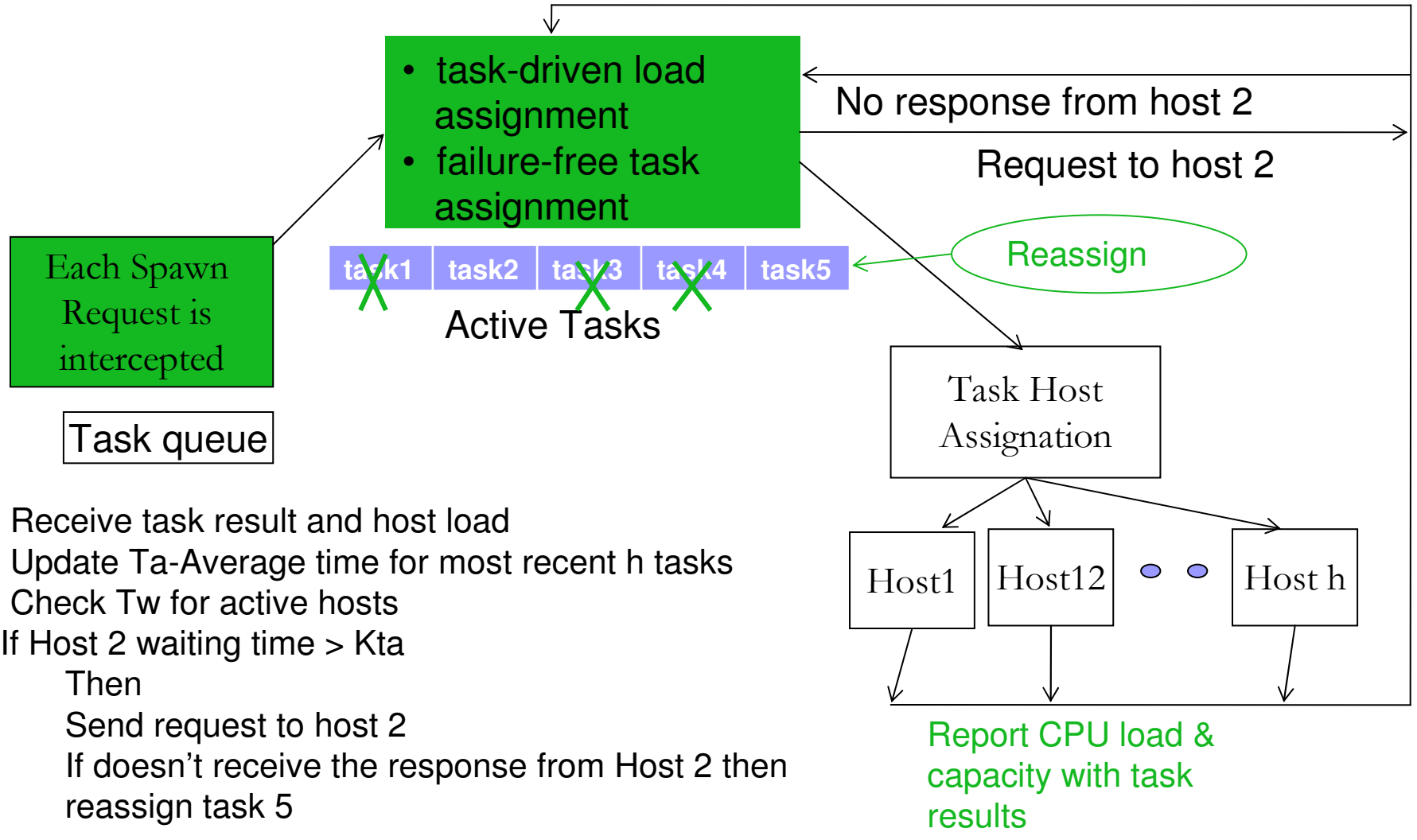


How the system works

host performance is report back with the result whenever a subtask finished in the host

Proposed System Architecture

2. Robustness



- Receive task result and host load
- Update Ta-Average time for most recent h tasks
- Check Tw for active hosts

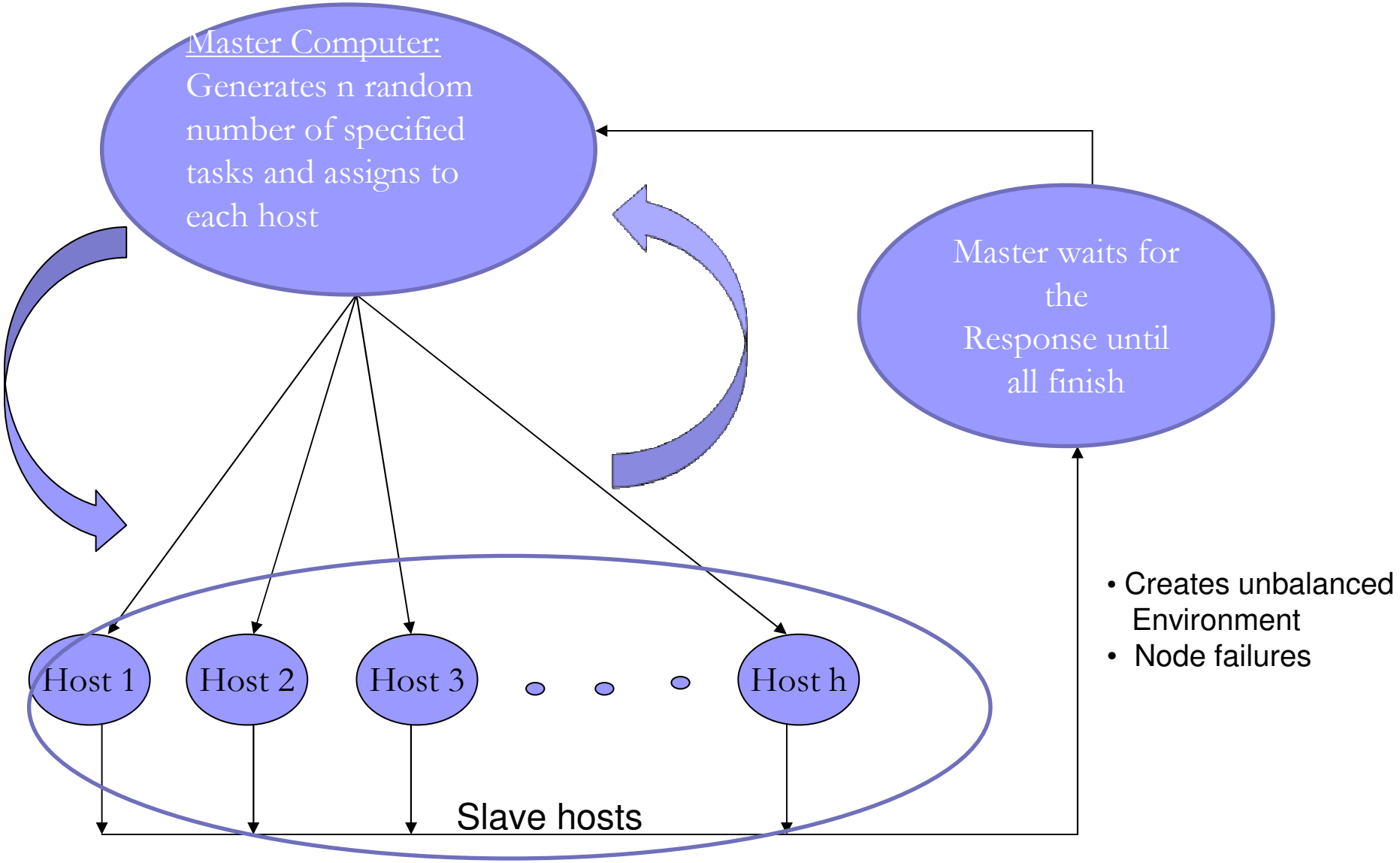
-If Host 2 waiting time > Kta

Then

Send request to host 2

If doesn't receive the response from Host 2 then reassign task 5

Test Bed Development



Future Works

- Implementation of Algorithm has to be done
- Test and Evaluate the software

Questions and Comments